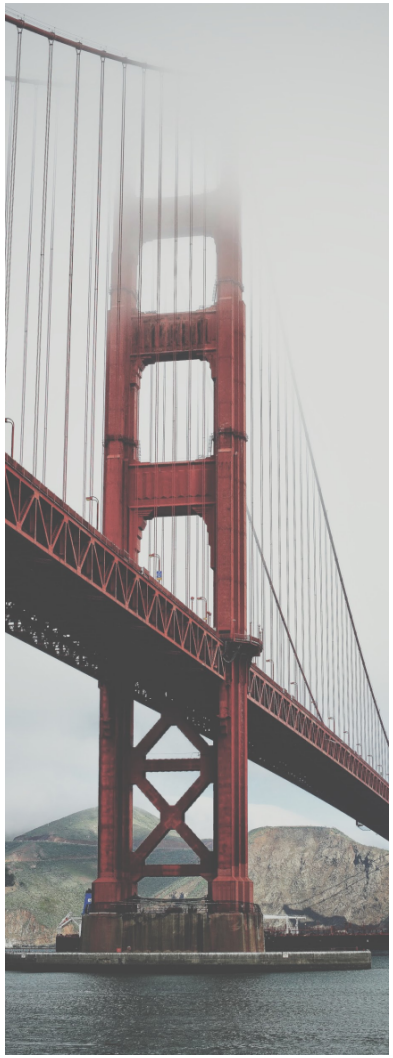


The Advantages of Machine Aided Co-reference Resolution for Research Cruise Metadata

Adam Shepherd • June 1 2017

Co-authors: Cyndy Chandler, Robert Ako, Douglas Fils, Danie Kinkade.

BCO-DMO
Biological & Chemical Oceanography Data Management Office

NSF

Oceanographic Research Cruise

http://seft.com.tr/web/wp-content/uploads/2015/02/RSV66_01.png

Oceanographic Research Cruise: 2 Ideas of a Cruise

https://s-media-cache-ak0.pinimg.com/originals/69/ba/c0/69bac098e46c629ec1959ff556e65e0e.png
http://seft.com.tr/web/wp-content/uploads/2015/02/RSV66_01.png
http://www.freeiconspng.com/uploads/institution-icon-8.png

Oceanographic Research Cruise: Reporting Their Ideas

BCO-DMO
Biological & Chemical Oceanography Data Management Office

https://s-media-cache-ak0.pinimg.com/originals/69/ba/c0/69bac098e46c629ec1959ff556e65e0e.png
http://seft.com.tr/web/wp-content/uploads/2015/02/RSV66_01.png
http://www.freeiconspng.com/uploads/institution-icon-8.png

Oceanographic Research Cruise: Linking to Authorities

BCO-DMO
Biological & Chemical Oceanography Data Management Office

https://s-media-cache-ak0.pinimg.com/originals/69/ba/c0/69bac098e46c629ec1959ff556e65e0e.png
http://seft.com.tr/web/wp-content/uploads/2015/02/RSV66_01.png
http://www.freeiconspng.com/uploads/institution-icon-8.png

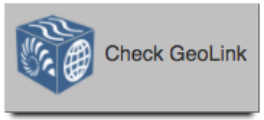
Oceanographic Research Cruise: Benefits of Linking

Deployment: AT11-07

Map It

Deployment: AT11-07
Chief Scientist: Dr Hans Schouten (Woods Hole Oceanographic Institution, WHOI)
Platform: R/V Atlantis
Platform Type: vessel
Start Date: 01/28/2004
End Date: 02/24/2004
Location: East Pacific Rise, Pacific

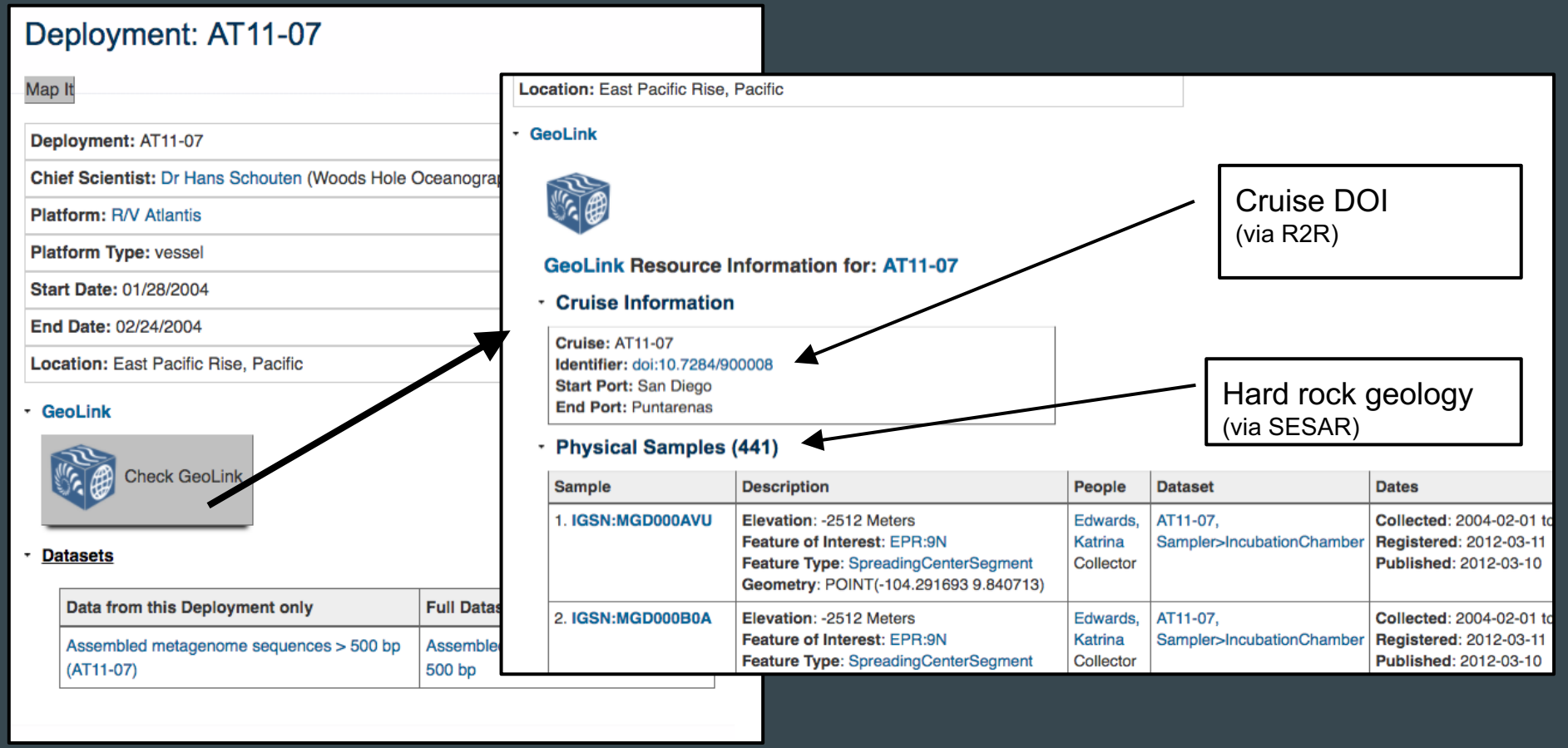
▾ **GeoLink**



▾ **Datasets**

Data from this Deployment only	Full Dataset (multiple deployments)
Assembled metagenome sequences > 500 bp (AT11-07)	Assembled metagenome sequences > 500 bp

Oceanographic Research Cruise: Benefits of Linking



2,049 BCO-DMO Cruises.

6,555 R2R Cruises.

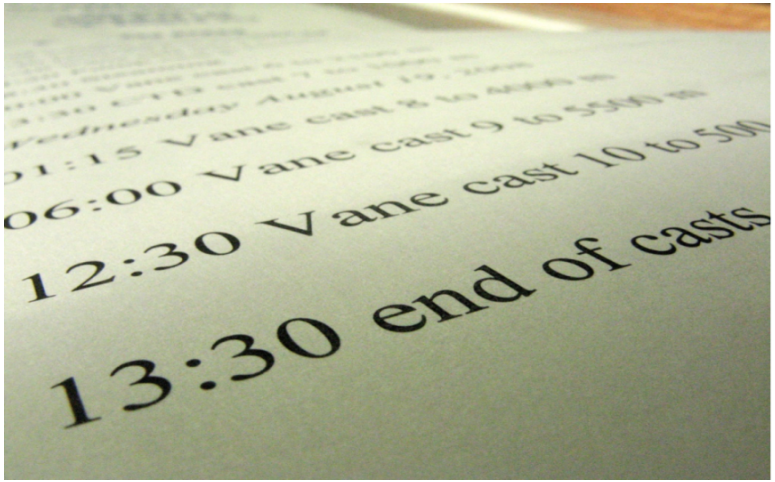
13,431,195 Comparisons.

28 Years.

15 seconds each, 40 hrs/wk, 50 wks/yr

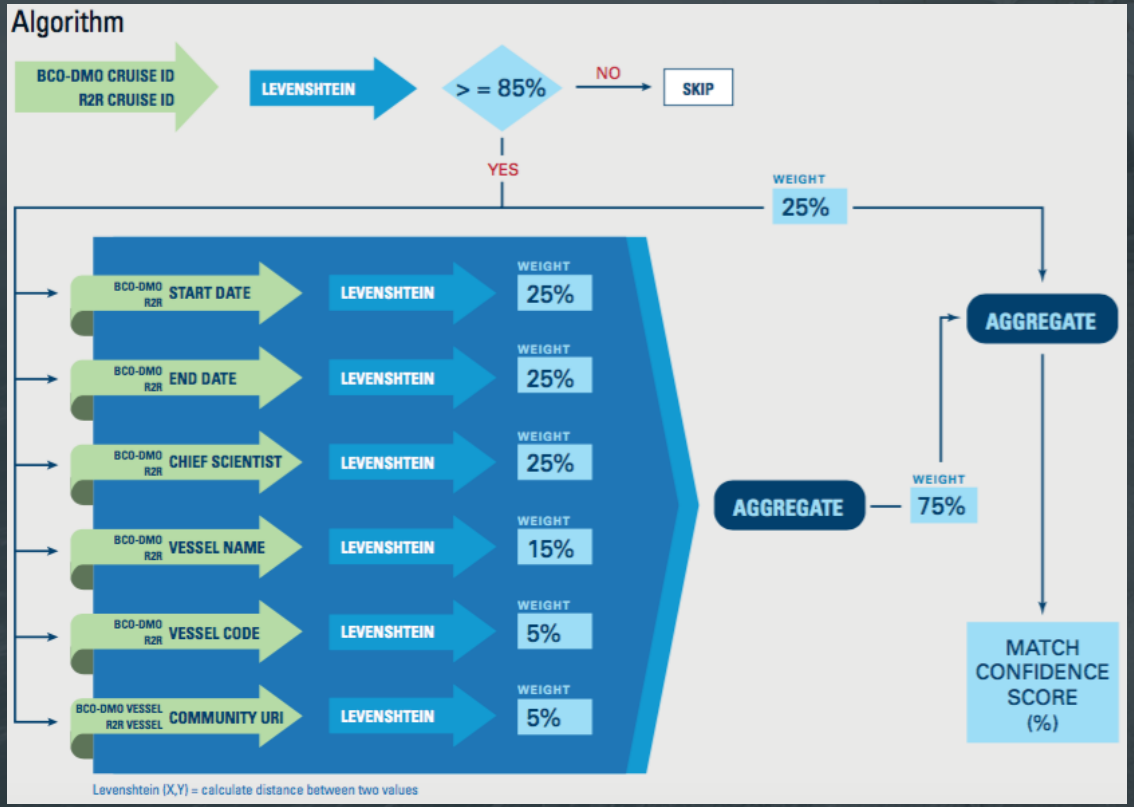
Entity Matching Ontology (EMO)

- Extends PROV-O
- Defines the properties of a 'Thing' that could be used for comparison
- Defines a potential match for a given Entity
- Hook for describing a matching algorithm



github.com/BCODMO/Entity-Matching-Ontologies

BCO-DMO / R2R EMO Extension



Check all BCO-DMO Cruises

CruiseID Match Threshold *

85

Set the floor on matching cruiseID scores. Valid values are between 1 and 100. The cruise ID matching score is a percentage where 100% represents a perfect match and 0% not matching at all

Calculate the combined cruise property match score

Weigh differences in cruise properties. The total of all weights should equal 100%.

Start Date * 25 25%
End Date * 25 25%
Chief Scientist * 25 25%
Vessel Code * 15 15%
Vessel Name * 5 5%
Community URI * 5 5%

Total: 100 %

Calculate the total score

Weigh the Cruise ID score with the combined cruise property score. The total of all weights should equal 100%.

Cruise ID Score Weight * 25 25%
Combined Property Score Weight * 75 75%

Total: 100 %

Potential Matches

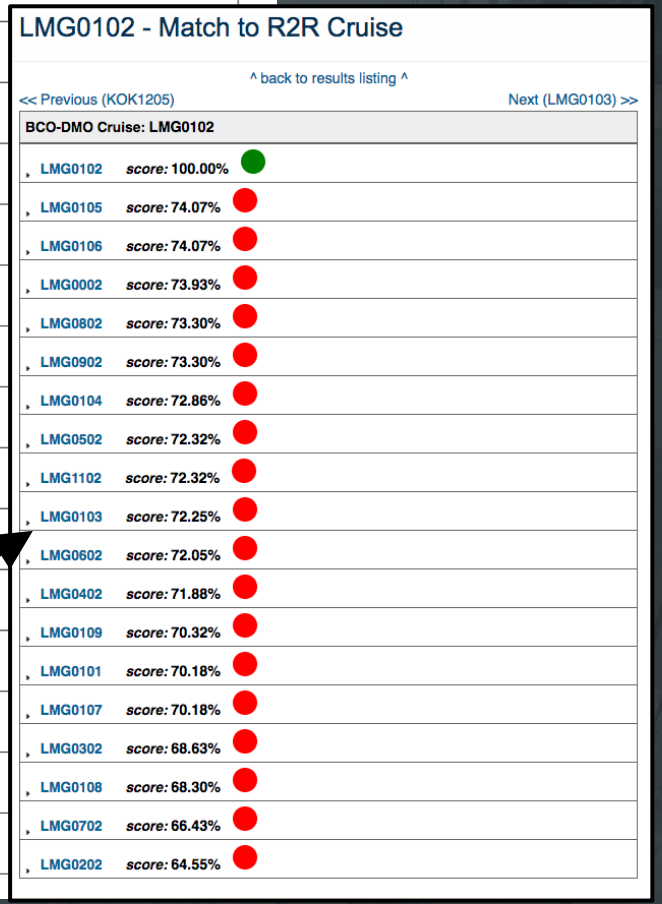
Potential Matches: 26 of 491

Cruise	Matches	Best Score	Existing Match
AT11-20	13	87%	
BH05-05	1	40%	
BH05-13	1	40%	
BH05-18	1	40%	
BH13-13	17	72%	
CB1007	1	81%	
CB1009	1	81%	
FK010	1	93%	
HRS1324	3	70%	
KM1416	1	100%	
KOK1115	4	77%	
LMG0102	19	100%	
LMG0414	6	77%	
LMG1312	5	100%	
MGL1216	11	96%	
NBP10-02	1		

Potential Matches

Potential Matches: 26 of 491

Cruise	Matches	Best Score	Existing Match
AT11-20	13	87%	
BH05-05	1	40%	
BH05-13	1	40%	
BH05-18	1	40%	
BH13-13	17	72%	
CB1007	1	81%	
CB1009	1	81%	
FK010	1	93%	
HRS1324	3	70%	
KM1416	1	100%	
KOK1115	4	77%	
LMG0102	19	100%	
LMG0414	6	77%	
LMG1312	5	100%	
MGL1216	11	96%	
NBP10-02	1		



Potential Matches

Potential Matches: 26 of 491

Cruise	Matches	Best Score	Existing Match
AT11-20	13	87%	
BH05-05	1	40%	
BH05-13	1	40%	
BH05-18	1	40%	
BH13-13	17	72%	
CB1007	1	81%	
CB1009	1	81%	
FK010	1	93%	
HRS1324	3	70%	
KM1416	1	100%	
KOK1115	4	77%	
LMG0102	19	100%	
LMG0414	6	77%	
LMG1312	5	100%	
MGL1216	11	96%	

LMG0102 - Match to R2R Cruise

^ back to results listing ^

<< Previous (KOK1205)

BCO-DMO Cruise: LMG0102

- LMG0102 *score:* 100.00%
- LMG0105 *score:* 74.07%
- LMG0106 *score:* 74.07%
- LMG0002 *score:* 73.93%
- LMG0802 *score:* 73.30%
- LMG0902 *score:* 73.30%
- LMG0104 *score:* 72.86%
- LMG0502 *score:* 72.32%
- LMG1102 *score:* 72.32%
- LMG0103 *score:* 72.25%
- LMG0602 *score:* 72.05%
- LMG0402 *score:* 71.88%
- LMG0109 *score:* 70.32%
- LMG0101 *score:* 70.18%
- LMG0107 *score:* 70.18%
- LMG0302 *score:* 68.63%
- LMG0108 *score:* 68.30%
- LMG0702 *score:* 66.43%
- LMG0202 *score:* 64.55%

LMG0102 - Match to R2R Cruise

^ back to results listing ^

<< Previous (KOK1205) Next (LMG0103) >>

BCO-DMO Cruise: LMG0102

LMG0102 *score:* 100.00%

Create Match

Match Type *

- Select a value -

Match Notes

Match Differences

Create Match

R2R Cruise Identifier: http://data.rvdata.us/id/cruise/LMG0102

BCO-DMO Cruise Identifier: http://lod.bco-dmo.org/id/deployment/671723(view in OSPREY)

Property	BCO-DMO	R2R	Score
Cruise ID	LMG0102	LMG0102	100.00%
Start Date	2001-02-20	2001-02-20	100.00%
End Date	2001-03-14	2001-03-14	100.00%
Chief Scientist	Smith, Craig	Smith, Craig	100.00%
Vessel Name	Laurence M. Gould	Laurence M. Gould	100.00%
Vessel Code	33LG	33LG	100.00%
Community URI	http://vocab.nerc.ac.uk/collection/C17/current/33LG	http://vocab.nerc.ac.uk/collection/C17/current/33LG/	100.00%

PROV for Comparing Matches over Time

AE1314	R2R Cruise: AE1314		100.00%	owl:sameAs	delete
AE1319	R2R Cruise: AE1319		100.00%	owl:sameAs	delete
AE1322	AE1322: R2R Cruise: AE1322		100.00%	owl:sameAs	delete
AE1409	AE1409: R2R Cruise: AE1409	End Date	98.13%	odo:matches	delete
AE1410	AE1410: R2R Cruise: AE1410	Start Date, End Date	94.38%	odo:matches	delete
AE1505	AE1505: R2R Cruise: AE1505		100.00%	owl:sameAs	delete
AE1516	AE1516: R2R Cruise: AE1516		100.00%	owl:sameAs	delete
AT11-04	AT11-04: R2R Cruise: AT11-04	Chief Scientist	94.08%	odo:matches	delete
AT11-07	AT11-07: R2R Cruise: AT11-07		100.00%	owl:sameAs	delete
AT11-17	R2R Cruise: AT11-17		100.00%	owl:sameAs	delete
AT11-30	R2R Cruise: AT11-30	Start Date	98.13%	odo:matches	delete
AT15-06	AT15-06: R2R Cruise: AT15-06		98.83%	owl:sameAs	delete
AT15-25	R2R Cruise: AT15-25	Chief Scientist	85.94%	odo:matches	delete
AT15-35	AT15-35: R2R Cruise: AT15-35		100.00%	owl:sameAs	delete
AT15-38	AT15-38: R2R Cruise: AT15-38		100.00%	owl:sameAs	delete
AT15-40	R2R Cruise: AT15-40		100.00%	owl:sameAs	delete

PROV-O + EMO helps us keep track:

Who asserted the match,

When,

Algorithm, Thresholds & Scores,

Original RDF,

and the EMO RDF.

"The job has its ups and downs. There's the swinging through the sky, the whale-watching, and the wielding of badass tools reminiscent of alien torture implements….[and] there's a weird kind of marine vertigo...."

- Chad Allan

bit.ly/chad-allan-job-quote

Chad is 1 of 28 that paint the Golden Gate Bridge. Year round.

"The job has its ups and downs. There's the swinging through the sky, the whale-watching, and the wielding of badass tools reminiscent of alien torture implements….[and] there's a weird kind of marine vertigo...."

- Chad Allan

bit.ly/chad-allan-job-quote

2,049 BCO-DMO Cruises.

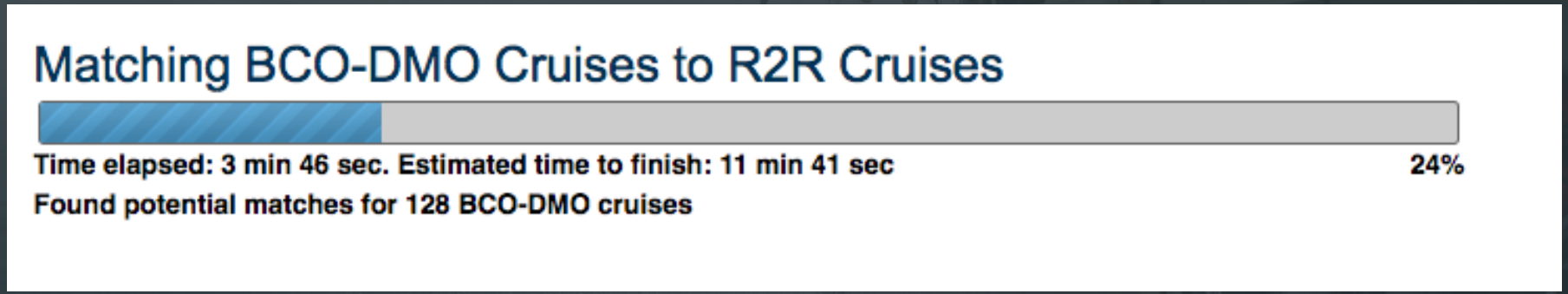
6,555 R2R Cruises.

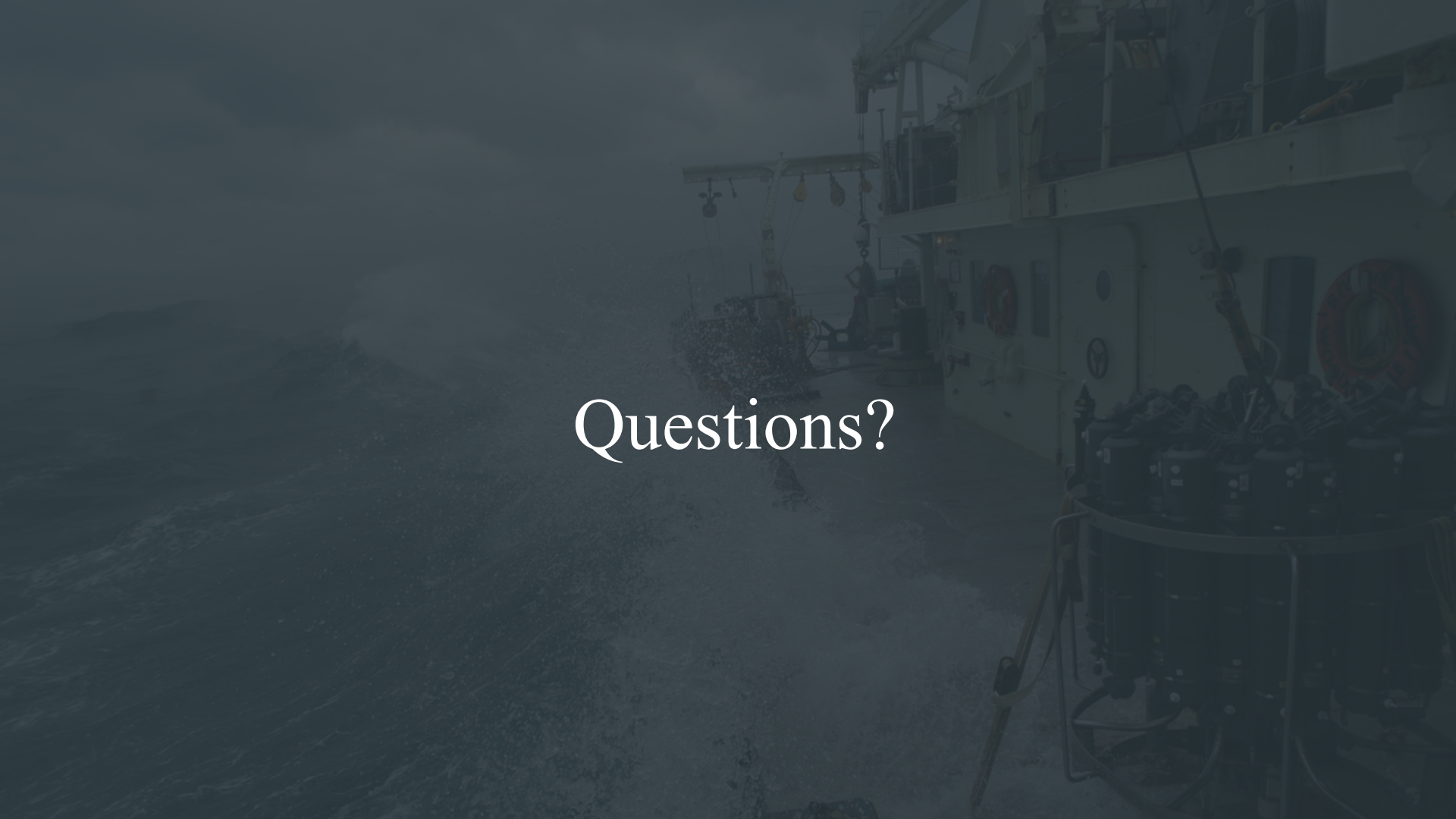
13,431,195 Comparisons.

28 Years.

15 seconds each, 40 hrs/wk, 50 wks/yr

28 years or 15 minutes...




Questions?